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In re Patent Application of: Glenn D. Begis

Title: CONTROL OF STREAMING OF SIGNALS IN A LOCAL AREA NETWORK

Attorney Docket No.: 884.181US1

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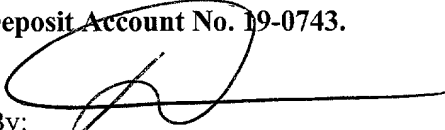
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UNITED STATES PATENT APPLICATION

**Control of Streaming of Signals in a Local Area Network**

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**Intel Docket P7428**

## Control of Streaming of Signals in a Local Area Network

### Technical Field of the Invention

The present invention relates generally to the field of telecommunications  
5 and, in particular, to control of streaming of signals in a local area network.

### Background

Conventionally, two distinct networks have been used to carry voice and  
data. The public switched telephone network (PSTN) is a network that was  
10 developed primarily as a network for carrying voice traffic. Similarly, the Internet is  
a network that was developed primarily to carry data traffic. The PSTN and the  
Internet conventionally carry data between users at diverse locations. Local  
networks connected to the PSTN or the Internet are conventionally also dedicated to  
carrying either voice or data. In a typical office environment, for example,  
15 telephones are connected to a private branch exchange (PBX) through one set of  
wires and computers and other data devices are typically connected to a local area  
network (LAN), e.g., an Ethernet LAN.

Recently, however, there has been a movement within the  
telecommunications industry to merge the data and voice networks. This trend has  
20 been seen not only in the PSTN and the Internet but also in the local networks, e.g.,  
the PBX and the LAN. With this merger of voice and data traffic, new products  
have been introduced that allow voice to be transported over a LAN, e.g., voice over  
Ethernet and voice over IP telephones.

Unfortunately, in these modified or hybrid networks, the only interaction  
25 between computing devices and voice devices is that the data to/from the computing  
devices and voice signals to/from the voice devices are carried over the same  
infrastructure. These networks make no attempt to merge the capabilities of the data  
and voice networks. Rather, the voice data is merely transported alongside regular  
data on the same wires. Further there are no mechanisms for controlling the  
30 streaming of voice data in these hybrid networks that would allow the networks to  
fully utilize the processing power of the computers connected to the local area  
network to enhance the voice communications by processing the voice streams.

For the reasons stated above, and for other reasons stated below which will become apparent to those skilled in the art upon reading and understanding the present specification, there is a need in the art for a mechanism to control the streaming of voice data in a local area network.

5

### Summary

The above mentioned problems with streaming of voice data in a local area network (LAN) and other problems are addressed by the present invention and will be understood by reading and studying the following specification.

10 In particular, an illustrative embodiment of the present invention includes a method for controlling the streaming of voice data in a local area network. The method comprises identifying at least one device to be used in a connection among a plurality of devices coupled to the local area network. The method further includes identifying at least one mode for each of the at least one device to be used in the  
15 connection and setting the at least one mode for the at least one device.

In another embodiment, a local area network is provided. The local area network comprises a server/gateway coupled to an external network. The local area network also includes a plurality of devices that send and receive voice data, the plurality of devices are selectively and communicatively coupled together and to the  
20 server/gateway. The local area network also includes a signal streaming controller, associated with the server/gateway and the plurality of devices, that selects a mode of operation for selected ones of the server/gateway and the plurality of devices.

### Brief Description of the Drawings

25 Figure 1 is a block diagram of an embodiment of a communication system according to the teachings of the present invention.

Figure 2 is a flowchart that illustrates an embodiment of a method for controlling the streaming of voice data in a local area network according to the teachings of the present invention.

### Detailed Description

The following detailed description refers to the accompanying drawings which form a part of the specification. The drawings show, and the detailed description describes, by way of illustration specific illustrative embodiments in which the invention may be practiced. These embodiments are described in sufficient detail to enable those skilled in the art to practice the invention. Other embodiments may be used and logical, mechanical and electrical changes may be made without departing from the scope of the present invention. The following detailed description is, therefore, not to be taken in a limiting sense.

Figure 1 is a block diagram of an embodiment of a communications system, indicated generally at 100, including a voice streaming controller 114 constructed according to the teachings of the present invention. System 100 includes a local area network 102 that supports streaming of data, e.g., voice data, to and from a plurality of communication devices. Local area network 102 is coupleable to data network 104, e.g., the Internet, and to voice network 106, e.g., the public switched telephone network. As voice and data networks continue to converge, in some embodiments local area network 102 may be connected to data network 104 or voice network 106 or a single network that carries both voice and data.

Local area network 102 provides a communication network that carries both voice and data over the same network infrastructure. Local area network 102 includes a server/gateway 108 that provides an interface for local area network 102 to data network 104 and voice network 106. In one embodiment, server/gateway 108 comprises a private branch exchange (PBX) with a server attachment. In another embodiment, server/gateway 108 comprises a server with a line card that allows voice signals to be processed by the server.

Server/gateway 108 is also coupled to a number of communication devices such as, for example, computer 110 and phone 112. Server/gateway 108 is also coupled to signal streaming controller 114. In one embodiment, signal streaming controller is a discrete system. In another embodiment, signal streaming controller 114 is a distributed capability performed by a combination of elements in system 100. It is noted that local area network 102 may include any appropriate number

and combination of communication devices. The devices shown in Figure 1 are provided by way of example and not by way of limitation. In one embodiment, phone 112 comprise an Ethernet or IP phone. In one embodiment, phone 112 is coupled to computer 110 exclusively via local area network 102. In another  
5 embodiment, phone 112 is coupled to computer 110 through a private connection such as a universal serial bus (USB) connection. In another embodiment, phone 112 is coupled to computer 110 through both local area network 102 and a private connection.

Computer 110 includes one or more application programs that operate on or  
10 process voice signals. For example, computer 110 includes software that performs one or more of the following functions: converts voice signals to text, translates text in a first language to text in a second, different language, converts text to voice signals, voice or speech recognition for a voice-activated calendar or other program, or any other appropriate function that accepts voice commands and/or voice data.

15 When a connection is initiated, signal streaming controller 114 selects source and sink modes of operation for the communication devices involved in the connection, e.g., modes for computer 110, phone 112, and server/gateway 108. The selected modes control the configuration of the communication devices for the communication model that is employed in the connection. For purposes of the  
20 specification, the term "connection" includes but is not limited to a stream of voice or other data generated by a communication device such as a telephone, microphone, software program or other appropriate communication device.

Specifically, in one embodiment, signal streaming controller 114 determines if and how each of the communication devices of local area network 102 operates as  
25 a sink and/or a source for data for a connection. Signal streaming controller 114 establishes the sink and source modes for each of the communication devices in order to implement the connection. For example, Table 1 below provides a sample of the different sink and source modes of operation for the three communication devices in local area network 102. In this example, local area network 102 includes  
30 phone 112, computer 110, and server/gateway 108. Signal streaming controller 114 selects the mode from Table 1 for the communication devices based on the functions

to be performed by the communication device. Signal streaming controller 114 notifies the communication devices of the proper mode for the connection.

SINK	SOURCE					
	Phone 112	Server/ Gateway 108	Computer 110	Phone 112 and Server/Gateway 108	Server/Gateway 108 and Computer 110	Phone 112 and Computer 110
Phone 112	X	Mode 1	Mode 2	X	Mode 10	X
Server/Gateway 108	Mode 3	X	Mode 4	X	X	Mode 11
Computer 110	Mode 5	Mode 6	X	Mode 12	X	X
Phone 112 and Server/Gateway 108	X	X	Mode 7			
Server/Gateway 108 and Computer 110	Mode 8	X	X			
Phone 112 and Computer 110	X	Mode 9	X			

5

**Table 1**

As shown in Table 1, a given communication device acting as a source may provide data to one or more communication devices acting as sinks. Concurrently, a device acting as a source may act as a sink and vice versa. For example, when signal streaming controller 114 receives a control input that indicates a voice stream originating with phone 112 is destined for both server/gateway 108 and computer 110, signal streaming controller 114 instructs phone 112 to function as a source in mode 8 such that server/gateway 108 and computer 110 act as sinks for the voice stream.

10

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In one embodiment, signal streaming controller 114 uses a semaphore to prevent one or more devices from changing modes simultaneously. In one embodiment, signal streaming controller 114 further includes a locking mechanism to prevent changes in the mode of the communication devices before completion of the application or event that drove the previous mode.

For pedagogical purposes, signal streaming controller 114 is shown in Figure 1 as a separate box on local area network 102. In one embodiment, signal streaming controller 114 is implemented on a server coupled to local area network 102. Signal streaming controller 114 communicates with the other communication devices to  
5 select and establish the appropriate modes for the devices for a connection. In another embodiment, signal streaming controller 114 is distributed among the various communication devices. In this case, the communication device that initiates a connection or function transmits signals to the other communication devices in the connection or function to set the proper mode for the connection or  
10 function. In another embodiment, signal streaming controller 114 is implemented on server/gateway 108. In each embodiment, the communication devices include circuitry or code that recognizes commands from signal streaming controller 114 to switch modes and that recognizes the functionality required for its operation during each mode.

15 In another embodiment, the functionality of signal streaming controller 114 is provided as program code on a computer readable medium such as a magnetic storage medium, e.g., a diskette, an optically readable medium, e.g., a compact disc, or a memory device.

Figure 2 is a flowchart of an embodiment of a process for controlling the  
20 streaming of data in a local area network according to the teachings of the present invention. The method of Figure 2 begins at 200. At block 202, the method determines whether it is acceptable to change the mode of communication devices coupled to a local area network. For example, the method determines whether a locking mechanism has been activated to prevent a communication device from  
25 attempting to change the mode of the communication devices coupled to the local area network prior to completion of an application or event that drove the previous modes. Further, in one embodiment, the method determines whether a semaphore has been activated to prevent multiple communication devices from attempting to simultaneously change the mode of communication devices coupled to the local area  
30 network.



If at block 202 the method determines that it is not acceptable to change modes, the method returns to block 202. If, however, at block 202 the method determines that it is acceptable to change modes, the method proceeds to block 204. At block 204 the method identifies communication devices to be used in a connection. For example, the method may select from a number of communication devices coupled to the local area network, such as, a computer, a telephone, a server, or any other appropriate communication device.

At block 206, the method identifies the modes for the selected communication devices. For example, in one embodiment, the method uses a table such as Table 1 above to select the appropriate modes for the communication devices. The method further sets the modes for the communication devices by providing signals to each communication device that indicates a next mode for the communication device at block 208. Once the modes for each of the communication devices are set, the method proceeds to stream the data to and from the communication devices at block 210. The method ends at block 212.

#### Examples

Signal streaming controller 114 advantageously allows a number of communication devices to interact over local area network 102 to implement a variety of functions. The following provides some examples of the functions that can be implemented in local area network 102. Thus, these examples are provided by way of example and not by way of limitation.

First, signal streaming controller 114 allows computer 110 and phone 112 to provide real time translation of voice data communicated over voice network 106. In this situation, signal streaming controller 114 sets phone 112 in source mode 5 and sink mode 1, and computer 110 in source mode 4 and sink mode 5 such that phone 112 acts as a source for voice data provided to server/ gateway 108 via computer 110 for transmission over data network 104 or voice network 106. Computer 110 performs the function of translating the voice data from a first language to a second language. For voice data arriving at server/gateway 108 from the computer 110, server/gateway 108 is placed in sink mode 4. For voice data

arriving at server/gateway 108 from an external network, server/gateway 108 is placed in source mode 1 allowing it to provide voice data directly to phone 112. Alternatively, server/gateway 108 is placed in source mode 6 to provide voice data to computer 110 for real-time translation of voice data received from data network 104 or voice network 106 for phone 112.

In another example, signal streaming controller 114 provides dial-in voice interaction with computer 110. Server/gateway 108 is placed in source mode 6 and sink mode 4 to act as a source/sink of voice data for computer 110. Computer 110 is placed in source mode 4 and sink mode 6 to act as a source/sink of voice data for server/gateway 108. This allows computer 110 to be operated remotely based on voice commands exchanged over an external network through server/gateway 108.

In another example, signal streaming controller 114 allows voice input to an agent, e.g., an application running on computer 110, during a phone call. In this example, server/gateway 108 is set in source mode 1 and sink mode 3 to act as a source/sink for voice data to/from phone 112. Phone 112 is set in source mode 8 so as to provide output to computer 110 and to server/gateway 108. Phone 112 is also set in sink mode 10 to allow it to receive voice data from computer 110 and server/gateway 108. Computer 110 is set in sink mode 5 and source mode 2 to allow computer 110 to stream voice/data to/from phone 112. In this manner, a user can use voice to interact with a program, e.g., a calendar program, running on computer 110 while carrying on a conversation on phone 112 over voice network 106 or data network 104.

In another example, signal streaming controller 114 provides voice interaction with a data network, e.g., a website on the Internet. In this example, phone 112 is set in source mode 5 and sink mode 2 to allow voice data to/from computer 110. Computer 110 is set in source mode 2 and sink mode 5 to allow voice data to/from phone 112. Computer 110 includes software that allows voice-activated control of a web browser based on voice signals from phone 112.

### Conclusion

A mechanism for controlling the streaming of data, e.g., voice streams, in a LAN has been described which selectively assigns source and sink modes for communication devices of a LAN to be used in a connection to allow cooperative functioning of the communication devices during the connection. Advantageously, this control mechanism harnesses the processing power of computers on a LAN to improve and enhance the operation of Ethernet/IP telephones and other communication devices on the LAN.

Although specific embodiments have been illustrated and described herein, it will be appreciated by those of ordinary skill in the art that any arrangement which is calculated to achieve the same purpose may be substituted for the specific embodiment shown. This application is intended to cover any adaptations or variations of the present invention. For example, signal streaming controller 114 can be implemented in software or hardware or a combination of both software and hardware. Further, modes other than the modes shown in Figure 1 can be used in a specific application in order to allow a number of communication devices to cooperate in order to coordinate sink and source for a voice stream. Further, although the specification describes a mechanism that works with voice data, it is understood that other kinds of signals, e.g., video, data, or other appropriate signals, could be controlled by the same mechanism.

What is claimed is:

1        1.        A method for controlling the streaming of voice data in a local area network,  
2        the method comprising:  
3                identifying at least one device to be used in a connection among a plurality  
4        of devices coupled to the local area network;  
5                identifying at least one mode for each of the at least one device to be used in  
6        the connection; and  
7                setting the at least one mode for the at least one device.

1        2.        The method of claim 1, wherein identifying the mode for each device  
2        comprises identifying at least one sink and at least one source for the connection.

1        3.        The method of claim 1, and further including locking the mode of the at least  
2        one device during the connection.

1        4.        The method of claim 1, and further using a semaphore to prevent multiple  
2        devices from simultaneously changing modes.

1        5.        The method of claim 1, wherein setting the at least one mode of the at least  
2        one device comprises setting at least one mode of at least one of a server, a  
3        telephone and a computer.

1        6.        The method of claim 1, wherein setting at least one mode of the at least one  
2        device comprises setting at least one mode of one device to communicate as a  
3        source for multiple devices on the local area network.

1        7.        The method of claim 1, and further including streaming data over the  
2        connection based on the at least one mode of the at least one device.

1        8.        The method of claim 7, wherein streaming data comprises:

2 transmitting voice signals from a telephone to a computer; and  
3 processing the voice signals with the computer.

1 9. The method of claim 7, wherein streaming data comprises:  
2 providing voice data from a telephone to a server for transmission over  
3 another network; and  
4 providing voice data to an application program running on a computer.

1 10. The method of claim 7, wherein streaming data comprises providing voice  
2 commands through a telephone to a computer to interact with an external network.

1 11. A computer readable medium having instructions stored thereon to perform  
2 the method comprising:  
3 identifying at least one device to be used in a connection among a plurality  
4 of devices coupled to a local area network; for  
5 identifying at least one mode for each of the at least one device to be used in  
6 the connection; and  
7 setting the at least one mode for the at least one device.

1 12. The computer readable medium of claim 11, wherein identifying the at least  
2 one mode for each device comprises identifying at least one sink and at least one  
3 source for the connection.

1 13. The computer readable medium of claim 11, and further including locking  
2 the mode of the at least one device during the connection.

1 14. The computer readable medium of claim 11, and further using a semaphore  
2 to prevent multiple devices from simultaneously changing mode.

1 15. The computer readable medium of claim 11, wherein setting the at least one  
2 mode of the at least one device comprises:

3           setting at least one mode of a server;  
4           setting at least one mode of a telephone; and  
5           setting at least one mode of a computer.

1       16.    The computer readable medium of claim 11, wherein setting the at least one  
2       mode of the at least one device comprises setting the mode of one device to  
3       communicate as a source for multiple devices coupled to the local area network.

1       17.    A local area network, comprising:  
2           a server/gateway coupled to at least one external network;  
3           a plurality of devices that send and receive voice data, the plurality of  
4       devices selectively and communicatively coupled together and to the  
5       server/gateway; and  
6           a signal streaming controller, associated with the server/gateway and the  
7       plurality of devices, that selects a mode of operation for selected ones of the  
8       server/gateway and the plurality of devices.

1       18.    The local area network of claim 17, wherein the plurality of devices  
2       comprises:  
3           at least one telephone coupled to the server/gateway; and  
4           at least one computer coupled to the server/gateway and coupled to the  
5       telephone.

1       19.    The local area network of claim 17, wherein the plurality of devices includes  
2       at least one of an Ethernet and an Internet Protocol phone.

1       20.    The local area network of claim 17, wherein the signal streaming mechanism  
2       includes a semaphore that prevents multiple devices from simultaneously changing  
3       state.

1        21.     The local area network of claim 17, wherein the signal streaming mechanism  
2        includes a locking mechanism that locks the mode of the at least one device during  
3        the connection.

1        22.     The local area network of claim 18, wherein the at least one computer  
2        includes an application program that responds to voice commands from at least one  
3        of the at least one telephone and the at least one external network.

Accepted for filing

### Abstract of the Disclosure

A method for controlling the streaming of voice signals in a local area network is provided. The method includes identifying at least one device to be used in the voice connection among a plurality of devices on the local area network. The method also identifies at least one mode for each of the at least one device to be used in the voice connection. The method sets the at least one mode for the at least one device and streams data over the voice connection based on the at least one mode of the at least one device.

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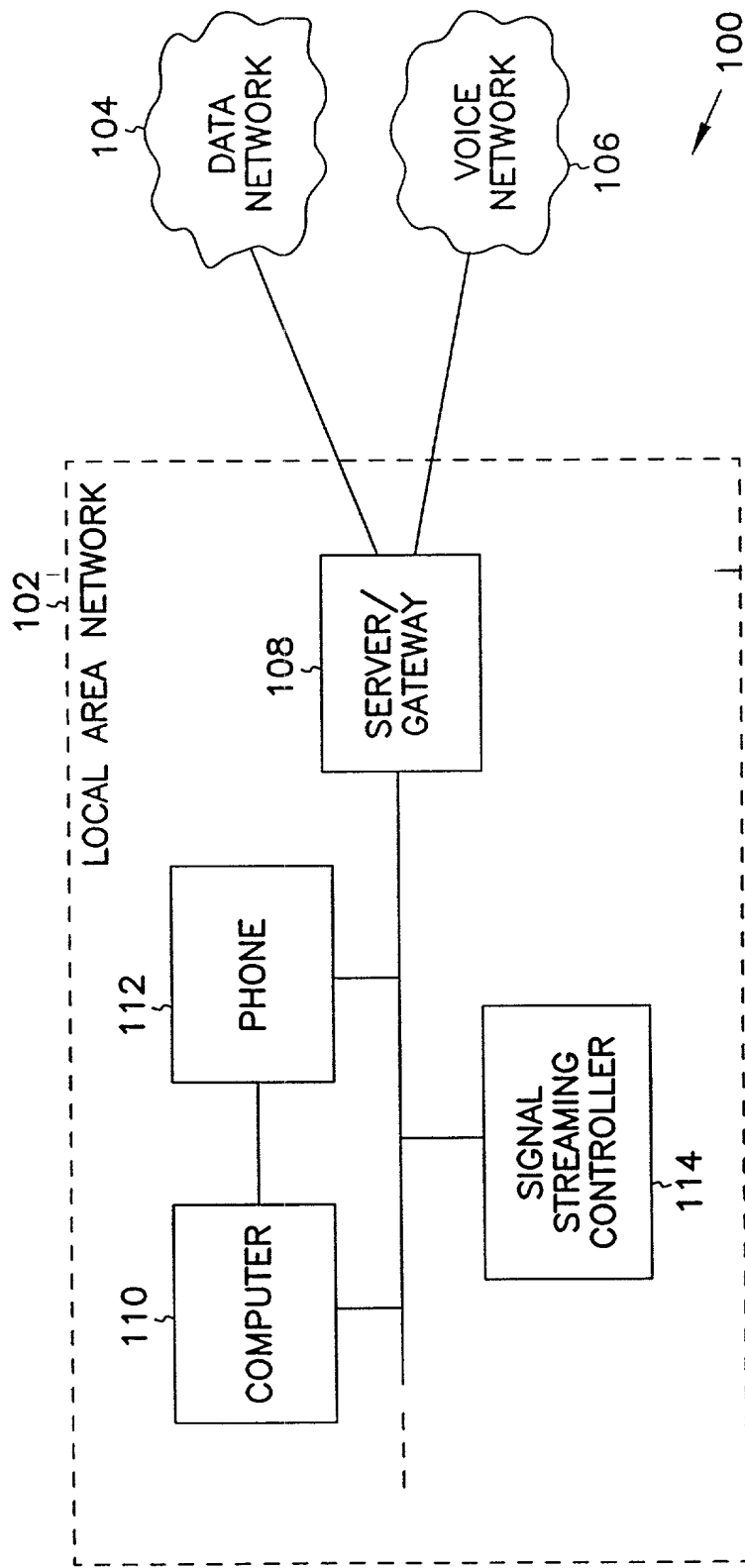


FIG. 1

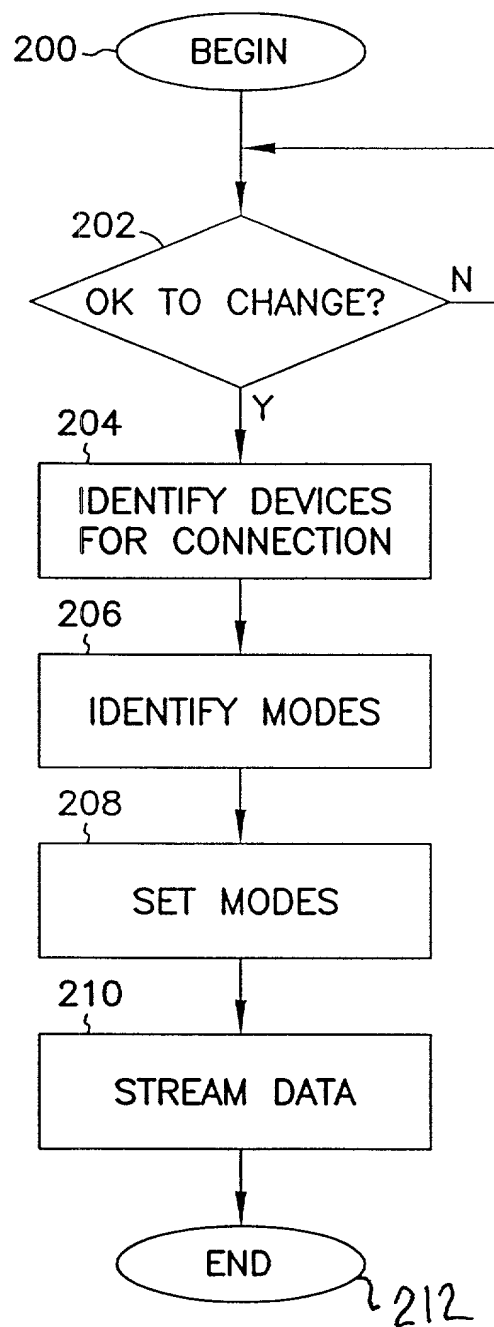


FIG. 2

SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A.

# United States Patent Application

## COMBINED DECLARATION AND POWER OF ATTORNEY

As a below named inventor I hereby declare that: my residence, post office address and citizenship are as stated below next to my name; that

I verily believe I am the original, first and sole inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled: **CONTROL OF STREAMING OF SIGNALS IN A LOCAL AREA NETWORK.**

The specification of which is attached hereto.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the patentability of this application in accordance with 37 C.F.R. § 1.56 (attached hereto). I also acknowledge my duty to disclose all information known to be material to patentability which became available between a filing date of a prior application and the national or PCT international filing date in the event this is a Continuation-In-Part application in accordance with 37 C.F.R. § 1.63(e).

I hereby claim foreign priority benefits under 35 U.S.C. § 119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on the basis of which priority is claimed:

**No such claim for priority is being made at this time.**

I hereby claim the benefit under 35 U.S.C. § 119(e) of any United States provisional application(s) listed below:

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I hereby claim the benefit under 35 U.S.C. § 120 or 365(c) of any United States and PCT international application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT international application in the manner provided by the first paragraph of 35 U.S.C. § 112, I acknowledge the duty to disclose material information as defined in 37 C.F.R. § 1.56(a) which became available between the filing date of the prior application and the national or PCT international filing date of this application:

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full Name of sole inventor:

**Glenn D. Begis**

Citizenship:

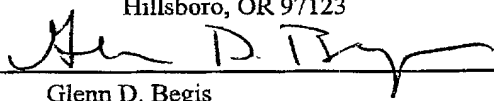
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Date:

**12/22/99**

Full Name of inventor:

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§ 1.56 Duty to disclose information material to patentability.

(a) A patent by its very nature is affected with a public interest. The public interest is best served, and the most effective patent examination occurs when, at the time an application is being examined, the Office is aware of and evaluates the teachings of all information material to patentability. Each individual associated with the filing and prosecution of a patent application has a duty of candor and good faith in dealing with the Office, which includes a duty to disclose to the Office all information known to that individual to be material to patentability as defined in this section. The duty to disclose information exists with respect to each pending claim until the claim is canceled or withdrawn from consideration, or the application becomes abandoned. Information material to the patentability of a claim that is canceled or withdrawn from consideration need not be submitted if the information is not material to the patentability of any claim remaining under consideration in the application. There is no duty to submit information which is not material to the patentability of any existing claim. The duty to disclose all information known to be material to patentability is deemed to be satisfied if all information known to be material to patentability of any claim issued in a patent was cited by the Office or submitted to the Office in the manner prescribed by §§ 1.97(b)-(d) and 1.98. However, no patent will be granted on an application in connection with which fraud on the Office was practiced or attempted or the duty of disclosure was violated through bad faith or intentional misconduct. The Office encourages applicants to carefully examine:

- (1) prior art cited in search reports of a foreign patent office in a counterpart application, and
- (2) the closest information over which individuals associated with the filing or prosecution of a patent application believe any pending claim patentably defines, to make sure that any material information contained therein is disclosed to the Office.

(b) Under this section, information is material to patentability when it is not cumulative to information already of record or being made of record in the application, and

- (1) It establishes, by itself or in combination with other information, a prima facie case of unpatentability of a claim; or
- (2) It refutes, or is inconsistent with, a position the applicant takes in:
  - (i) Opposing an argument of unpatentability relied on by the Office, or
  - (ii) Asserting an argument of patentability.

A prima facie case of unpatentability is established when the information compels a conclusion that a claim is unpatentable under the preponderance of evidence, burden-of-proof standard, giving each term in the claim its broadest reasonable construction consistent with the specification, and before any consideration is given to evidence which may be submitted in an attempt to establish a contrary conclusion of patentability.

(c) Individuals associated with the filing or prosecution of a patent application within the meaning of this section are:

- (1) Each inventor named in the application;
- (2) Each attorney or agent who prepares or prosecutes the application; and
- (3) Every other person who is substantively involved in the preparation or prosecution of the application and who is associated with the inventor, with the assignee or with anyone to whom there is an obligation to assign the application.

(d) Individuals other than the attorney, agent or inventor may comply with this section by disclosing information to the attorney, agent, or inventor.